

US Forest Service Forest Inventory and Analysis Program (FIA)



ABoVE Science Team Meeting, Anchorage AK January 2015
Beth Schulz, USFS PNW RMA

Objectives

- Ongoing FIA research and monitoring activities beyond the ABoVE projects
- Who uses FIA data
- Key information needs for monitoring environmental change
- Opportunities collaborate with ABoVE

USDA Forest Service

- National Forest and Grassland Systems
 - Tongass National Forest
 - Chugach National Forest
- State and Private Forestry
 - Cooperative Forestry/Biomass
 - Forest Health Protection
- Research and Development
 - Pacific Northwest Research Station
 - Bonanza Creek Long-Term Ecological Research
 - Juneau Forestry Sciences Lab
 - Forest Inventory and Analysis Program (FIA)

FIA Basics

- National forest inventory program
- Permanent plot network all forest lands
- Plot remeasurement on 5-10 year cycles
- Original focus on timber resources
- Other resources now included
- Interior Alaska now initiated
- Pilot inventory in interior AK 2014 with NASA support, on-going partnership

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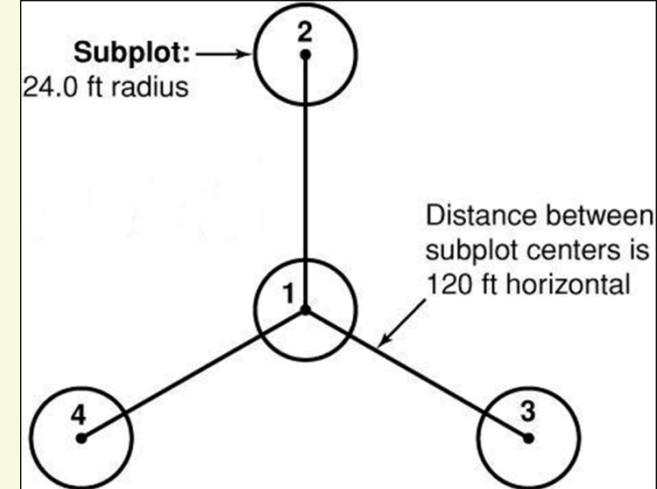
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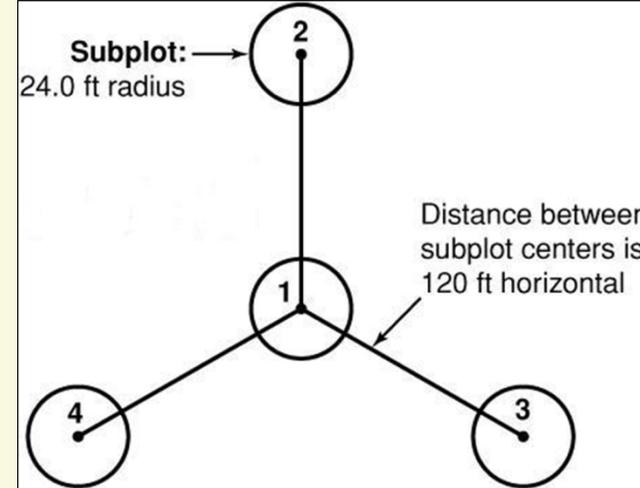
FIA Data

- Plot location
 - LAT LON, ELEV, slope, aspect, topo position
- Condition
 - Stand age, forest type, etc.
- Individual tree data
 - Species, height, DBH, dead or alive
- VEG Profile
 - Growth habit and species cover, height layer, small and large trees
- Downed wood
 - Transect measurements of coarse, fine woody material
 - Fuel bed assessment



FIA Data

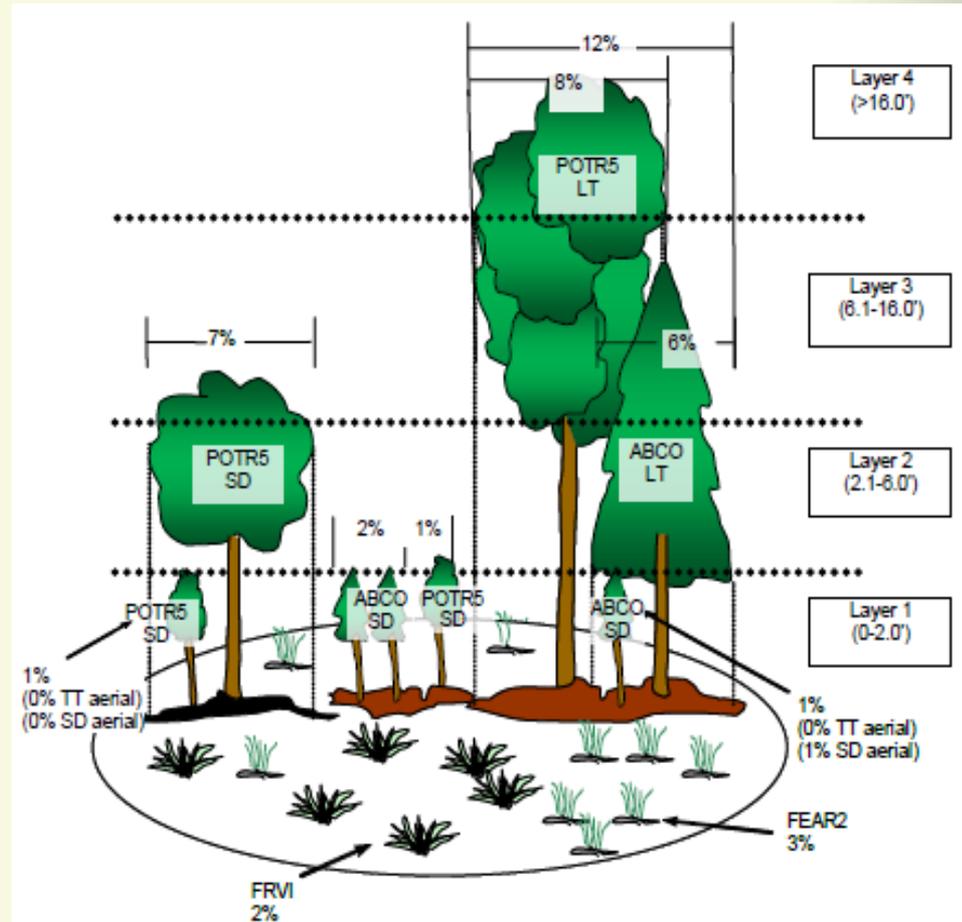
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The VEG Profile

- Cover by growth habit by layer
- Most abundant species per growth habit

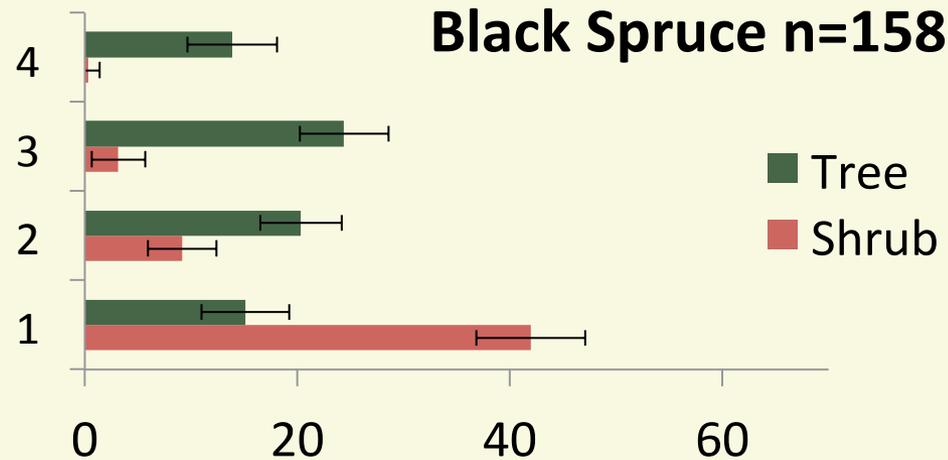
Both large and small trees included!



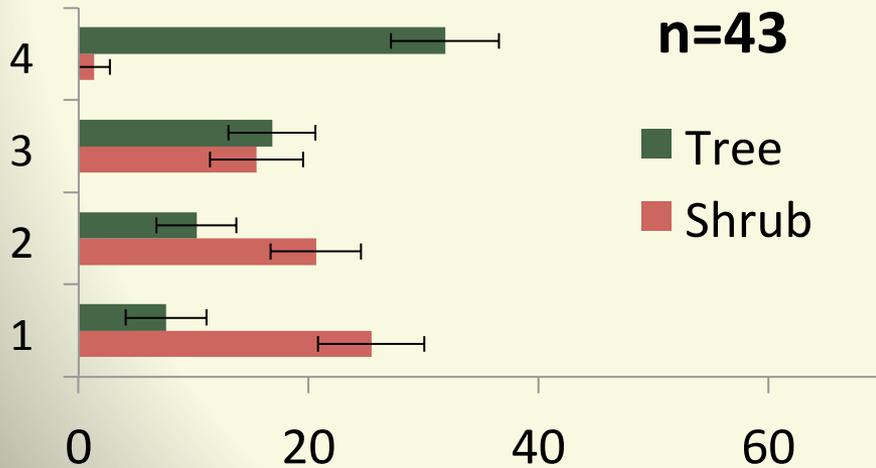




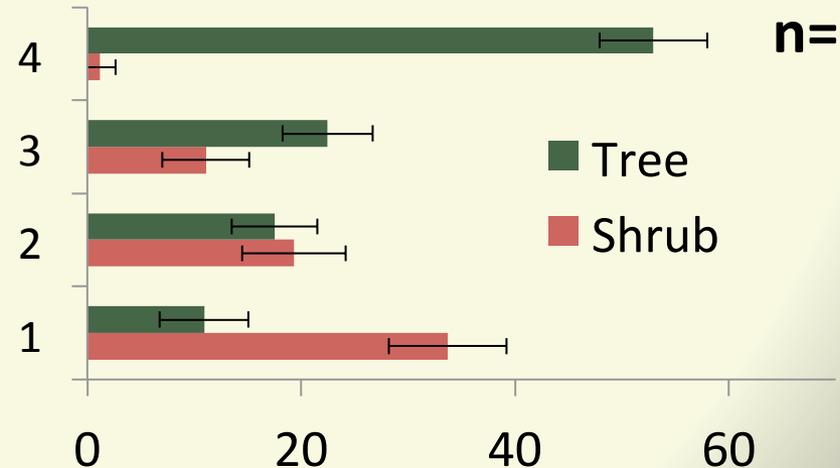
Growth Habit Cover by Layer by FIA Forest Type



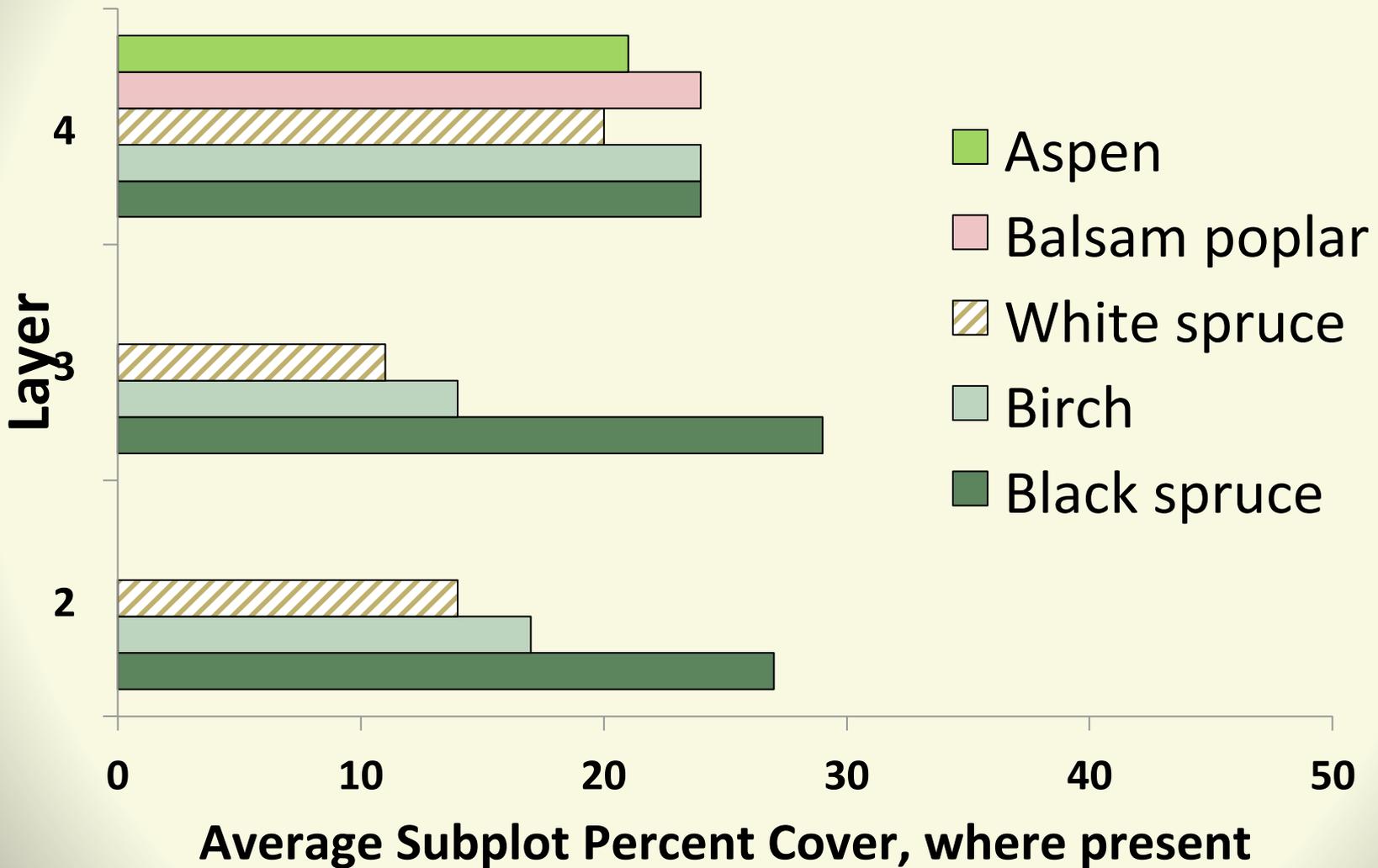
White Spruce n=43



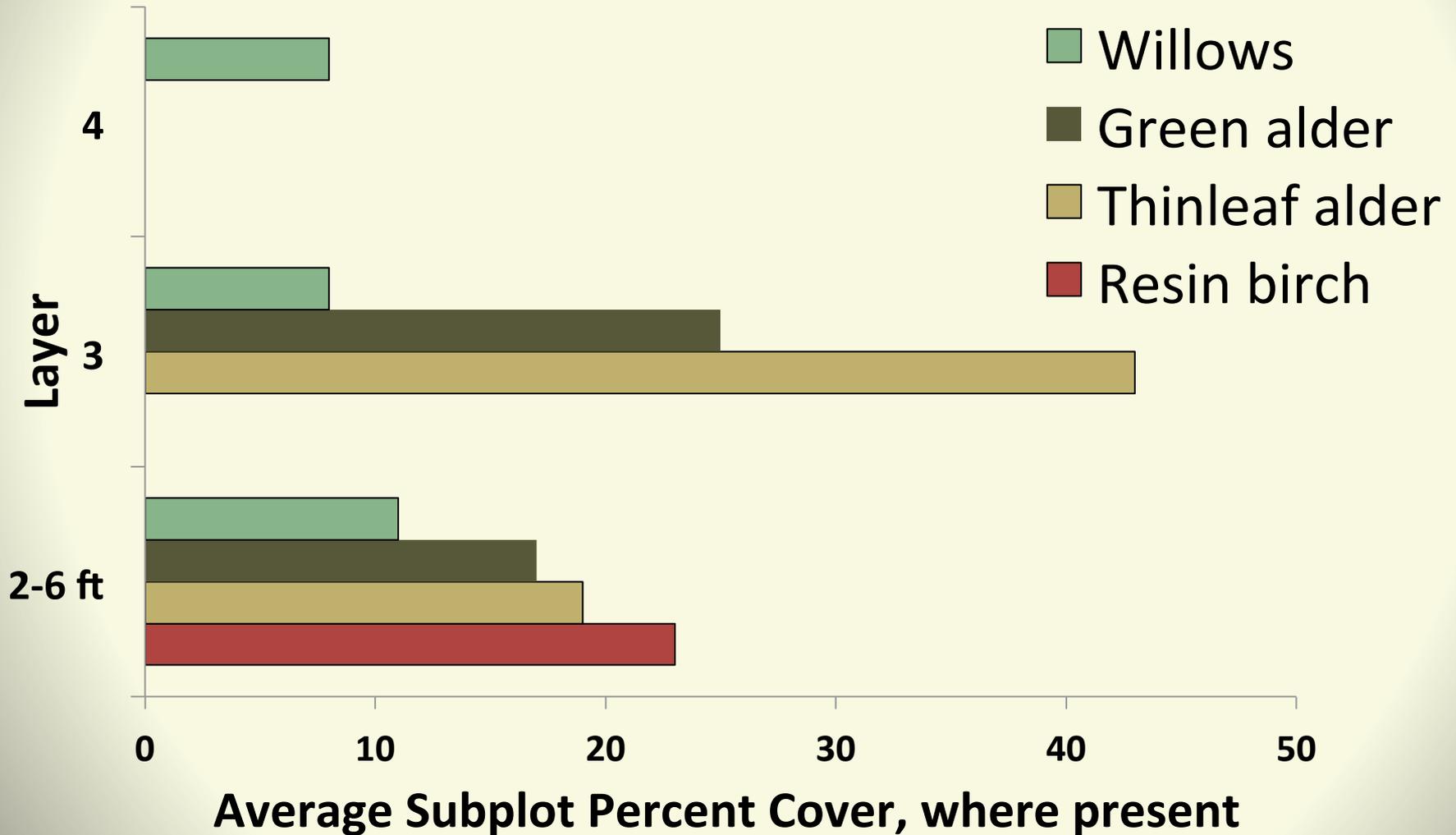
Birch n=65



Tree Species Cover



Tall Shrub Species



Additional protocols for interior Alaska

- Ground Layer Indicator
- Soils

Ground Layer Indicator

- Non-vascular plants sampled at 32 micro-quads (8 per subplot)
- Cover and depth by functional groups
- Estimate biomass, C and N content among terrestrial bryophytes and lichens



Functional groups: moss/lichen mats influence forests

Forage lichens



N-fixing lichens



Crust lichens



Fruticose lichens



Feather moss



N-fixing moss



Turf moss

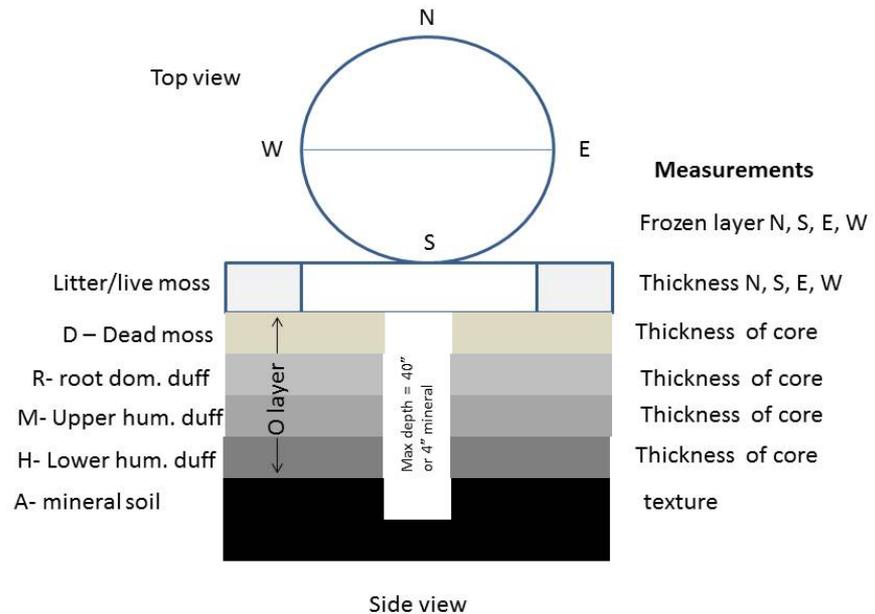


Sphagnum moss

Functional group = a collection of species with similar “effect” traits
Functional consequences = forest nutrients, carbon storage, soil processes, hydrology, wildlife forage, ...

Soils

- Measure thickness and collect sample of each organic horizon and sample top 4 inches of mineral soil.
- Measure depth of thaw (permafrost or seasonal frost)
- Collect soil core sample for further analysis (C, bulk density, etc.)
- Now 3 samples/plot



Alaska FIA Units and their State Equivalents (in Square Miles)

- All Interior Plots @ 1/5 Intensity (11,112 total plots) (all plot locations and #'s depicted are approximate)
- 2014 Tanana Pilot Completed Plots (103 plots)

— Major Highways and Roads

□ Alaska FIA Inventory Unit Boundaries

■ Interior Units

□ North Slope - 78,861mi (Nebraska) (~ 1705 plots)

□ Lower Yukon - 158,332mi (Montana) (~ 3414 plots)

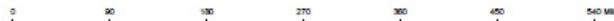
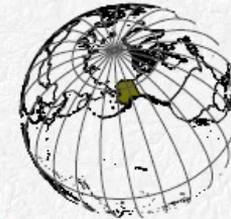
□ Upper Yukon - 59,622mi (Georgia) (~ 1278 plots)

□ Tanana - 53,503mi (Arkansas) (~ 1159 plots)

□ Susitna Copper - 47,982mi (Pennsylvania) (~ 1034 plots)

□ South West, 119,746mi (Arizona) (~ 2522 plots)

□ Coastal Unit - 70,055mi (Oklahoma) (@ full intensity ~ 10,000 total plots [not depicted])



Map created by: Edraley, Anchorage Forestry Sciences Lab; 10/26/2015.
Note: Any and all plot coordinates or other locations depicted are approximate. Map should be used for planning and information purposes only.

Who uses FIA data

- National Greenhouse Gas Inventory
- LANDFIRE
-
- US National Vegetation Classification

Climate Change

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Climate Change Home

Basic Information

Greenhouse Gas Emissions

- Overview of Gases
- Sources of Emissions
- Global Data
- National Data
- Facility Data
- Individual Calculator

Science

Impacts

Adaptation

What EPA is Doing

What You Can Do

Newsroom

Glossary

Students' Site

You are here: [EPA Home](#) » [Climate Change](#) » [Emissions](#) » [National Greenhouse Gas Emissions Data](#) » 2014 Report

U.S. Greenhouse Gas Inventory Report: 1990–2013

- [About the emissions inventory](#)
- [Overview of greenhouse gases and sources of emissions](#)
- [See the data](#)
- [Full report](#)

About the Emissions Inventory

EPA develops an annual report called the Inventory of U.S. Greenhouse Gas Emissions and Sinks (Inventory). This report tracks total annual U.S. emissions and removals by source, economic sector, and greenhouse gas going back to 1990. EPA uses national energy data, data on national agricultural activities, and other national statistics to provide a comprehensive accounting of total greenhouse gas emissions for all man-made sources in the United States. EPA also collects greenhouse gas emissions data from individual facilities and suppliers of certain fossil fuels and industrial gases through the [Greenhouse Gas Reporting Program](#).

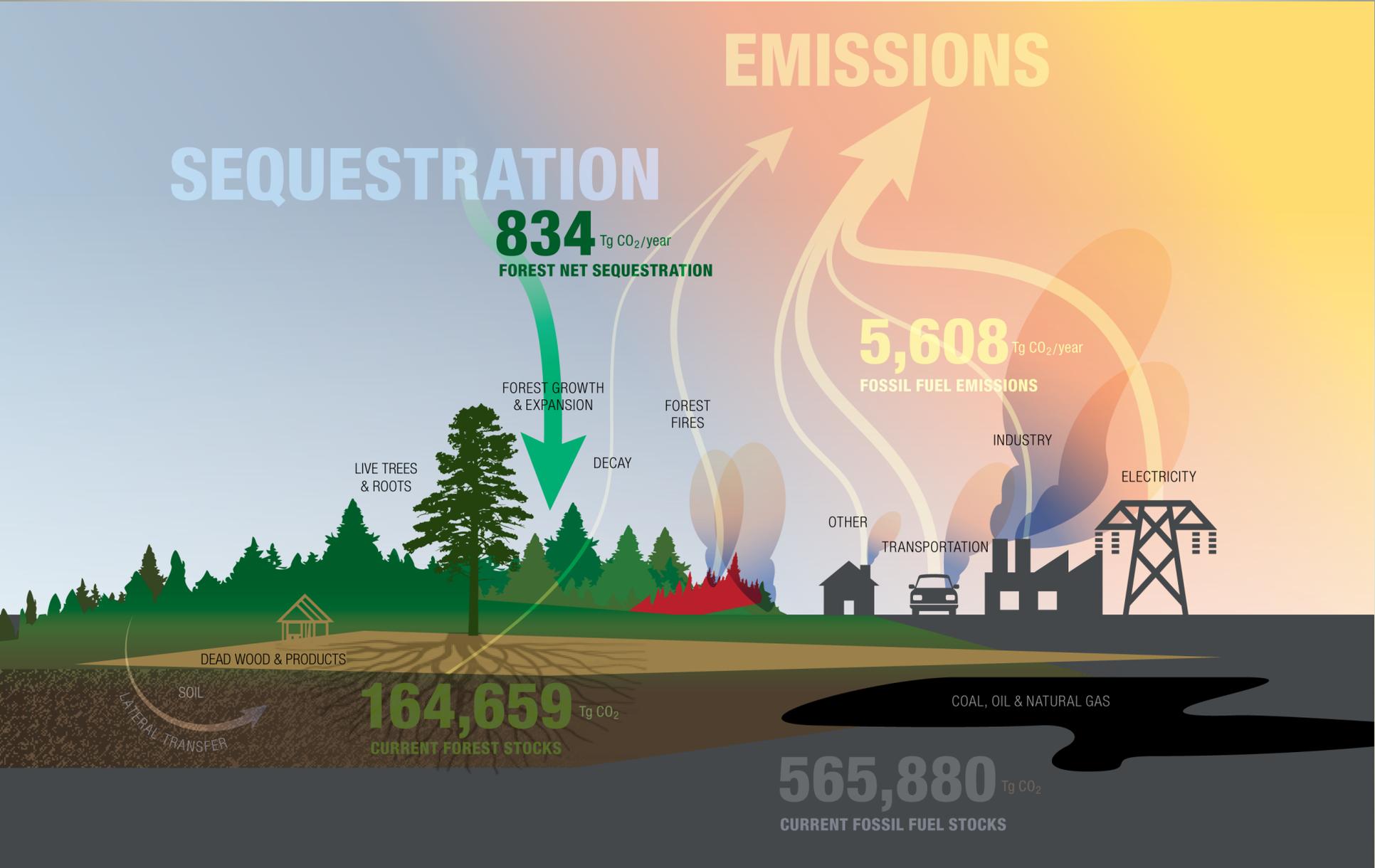
The national greenhouse gas inventory is submitted to the United Nations in accordance with the [Framework Convention on Climate Change](#) [\[EXIT Disclaimer\]](#). In preparing the annual emissions inventory report, EPA collaborates with hundreds of experts representing more than a dozen U.S. government agencies, academic institutions, industry associations, consultants and environmental organizations.



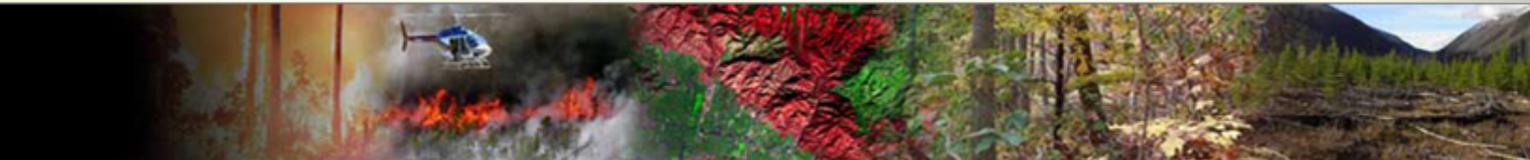
Explore emissions data with EPA's interactive tool

Related Links

- [11/19/15 Workshop on Petroleum and Natural Gas Systems](#)
- [Natural Gas Systems Data in the Inventory](#)
- [U.S. Greenhouse Gas](#)



Forest Carbon Cycle in Context of US Emissions



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Alerts

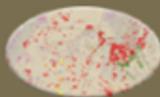
Notifications

Get Data

D
A
T
A



Reference



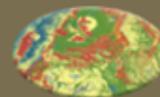
Disturbance



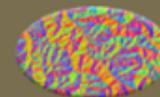
Vegetation



Fuel



Fire Regime



Topographic

LANDFIRE PARTNERS



LANDFIRE Partners

[Read more...](#)

LANDFIRE is a program that provides over 20 national geo-spatial layers (e.g. vegetation, fuel, disturbance, etc.), databases, and ecological models that are available to the public for the US and insular areas. [Learn more...](#)



LANDFIRE ... [more than fire](#)

TOOLS

LANDFIRE NEWS

GET DATA

<http://www.landfire.gov/>

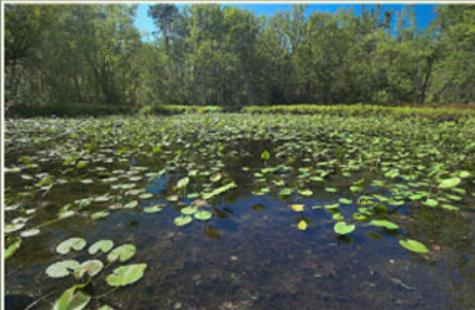
Access a dynamic map to



[Overview](#) | [Get Involved](#) | [Explore The Classification](#) | [Revisions](#) | [Data Standard](#) | [Resources](#) | [About](#)

The U.S. National Vegetation Classification

YOUR GUIDE TO INVENTORING NATURAL AND CULTURAL PLANT COMMUNITIES



Your Guide to Inventoring Natural and Cultural Vegetation Communities

Classifying vegetation is a critical to sound ecological science and efficient land assessment, management and planning. The National Vegetation Classification (NVC) is a central organizing framework for how all vegetation in the United States is inventoried, from broad scale formations (biomes) to fine-scale plant communities. The NVC is to produce uniform statistics about vegetation resources. The NVC is based on vegetation data gathered at local, regional, or national scales.

Highlights

[Website Launch](#) >

Provides a common vegetation hierarchy “language”

- Federal Geographic Data Committee Vegetation Subcommittee members*
- U.S. Forest Service (Lead Agency)
- U.S.G.S. Core Science Analytics and Synthesis
- Ecological Society of America
- NatureServe

Black spruce forest type plots provide examples from at least 4 Macrogroups, and 6+ Groups

1.B.4 Boreal Forest & Woodland

D014 1.B.4.Na North American Boreal Forest & Woodland

M156 Alaskan-Yukon North American Boreal Forest

G350 Alaskan-Yukon Boreal Mesic-Moist Black Spruce Forest

M179 North American Boreal Subalpine & Subarctic Woodland

G633 Western Subarctic Woodland

G646 Boreal Subalpine Woodland

1.B.5 Boreal Flooded & Swamp Forest

D016 1.B.5.Na North American Boreal Flooded & Swamp Forest

M299 North American Boreal Acidic Conifer Bog & Swamp

G546 West-Central Boreal Black Spruce - Tamarack Acidic Bog & Swamp

G-BSw Wet black spruce--new group, not described

2.C.2 Temperate to Polar Bog & Fen

D029 2.C.2.Na North American Bog & Fen

M876 North American Boreal & Sub-Boreal Acidic Bog & Fen

G360 Western North American Boreal Acidic Bog & Fen



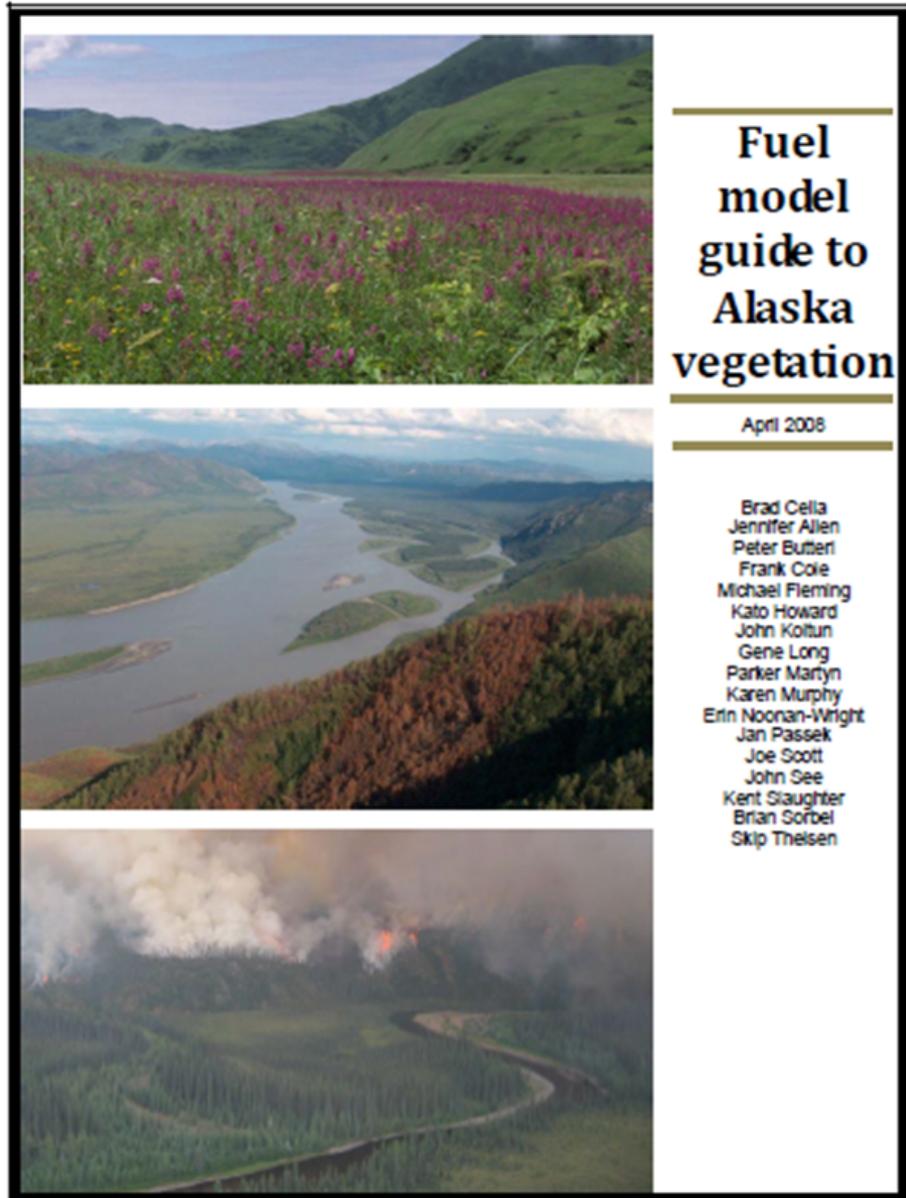
Alaska Natural Heritage Program USNVC Boreal plot network



Fire modelers want to know fuel bed conditions

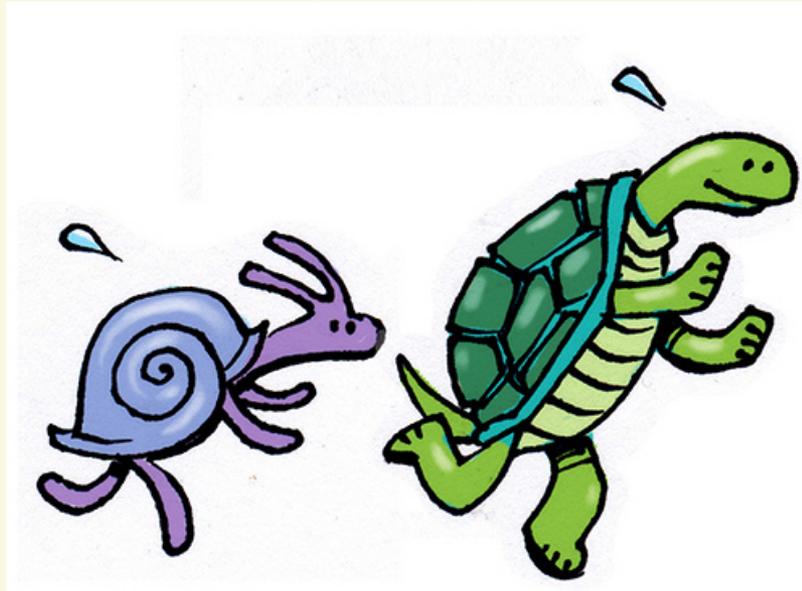
New FIA protocol includes an assessment

The Alaska Fuel Model Guide in revision



Key information needs

- Before change can be detected, need an established baseline
- Chasing a moving target



Changes already documented...

- Permafrost degradation is changing water regimes – forests to fens or bogs
- Hardwoods replacing spruce in some areas
- White spruce forests are expanding in others
- Pest outbreaks have influenced vegetation composition
- Woody invasions of wetlands
- Shrubs and trees moving into alpine/tundra

Why do we care?

- These changes affect:
 - Biomass accumulation
 - Carbon cycles
 - Wildfire fuel structure
 - Greenhouse gas emissions
 - Ecological services
 - Wildlife habitat
 - Berry crops
 - Access for subsistence activities
 - Vegetation communities



Key information needs (my perspective)

- Basic information on above-ground biomass beyond “tally” tree species
 - Allometric equations for large shrubs, non-tally trees
 - Appropriate measurements (drc)
- Better information on the locations/rates of permafrost change
 - Thermokarst features observed by
 - Field crews
 - Remotely sensed data

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Opportunities with ABoVE

- Established MOU's –
 - USFWS Kenai and Tetlin Refuges
- Similar interests:
 - permafrost degradation,
 - shifting vegetation communities,
 - biomass
 - (basic biomass studies, anyone?)
- NVCS and LANDFIRE revisions – calling all plot data and expert advise!

A scenic landscape featuring a dense forest of green trees along a shoreline. The forest is reflected in a calm body of water in the foreground. The sky is blue with large, white, fluffy clouds. The overall scene is peaceful and natural.

Thanks!

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